

December 2004

## A 21st century look at an ancient concept: Understanding FRBR

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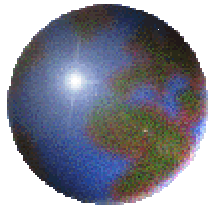
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### Recommended Citation

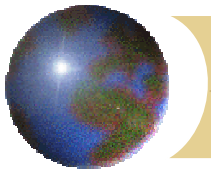
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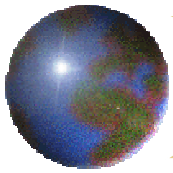
*A 21st century look at an  
ancient concept:  
Understanding FRBR*

Anita Sundaram Coleman, Asst. Prof.  
SIRLS, University of Arizona  
Presentation at the AzLA Conference,  
2 Dec. 2004, Tucson, AZ



# Overview

- ✿ The library's most enduring artifact: *the bibliographic record*.
- ✿ *IFLA's Functional Requirements for Bibliographic Records (FRBR)*
- ✿ Illustrations, practical implementations, and research initiatives.
- ✿ Look into our past, present and future



# *An Enduring Artifact*

PINAKES  
A Subject Launchpad



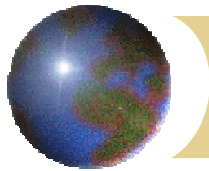
## Colophon

### 1500 BCE Hittites

- Embedded bibliographic data into the work
- Gave number of tablet in series, name, and scribe

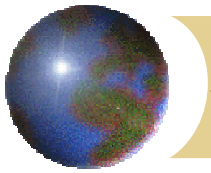


Coleman, FRBR, 2 Dec. 2004, AzLA  
Conference, Tucson



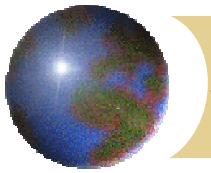
## *Bibliographic record (BR)*

- ❖ “Description of an information package”  
–Taylor, 2004, p. 357.
- ❖ Alternate names for Bibliographic Record are: catalog record, surrogate record, metadata record
- ❖ Less common: index record, MARC record, citation (limited AND limiting)



## *Foundational Element*

- ✚ We can find examples of bibliographic records in tablets, print, microform, and electronic media
- ✚ Bibliographical records are the foundational element in our information organization and retrieval tools (Ex: library catalogs, finding aids)



# *Function of the Catalogue*

## **Cutter:**

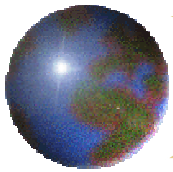
- ➊ To enable a person to find a book of which either the author, (or) subject is known
- ➋ To show what the library has on a given subject (or) in a given kind of literature
- ➌ To assist in the choice of a book as to its edition (or) as to its character.

## **Paris Principles:**

The catalogue should be an efficient tool for ascertaining whether the library contains a particular book specified by its author and title, or ...its title alone, or... a suitable substitute for the title

Which works by a particular author (or)

Which editions of a particular work are in the library.



# British Library OPAC

Integrated Catalogue - Basic Search - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Address <http://catalogue.bl.uk/> Search Web Search 391 blocked AutoFill Options british library catalog

Log in | End session | Display options | Feedback | Help

**BRITISH LIBRARY** **INTEGRATED CATALOGUE**  
Catalogue: Integrated Catalogue

Home About Search Results Previous searches My folder Blank order form

Basic search Advanced search Catalogue subset search Browse

Basic Search of Integrated Catalogue

Type word or phrase [Search hints](#)

Search by Word from title

Exact phrase? Any word  
Word from author  
Word from title  
Publication year  
Publisher  
Subject  
Subject heading (Library of Congress)  
ISBN  
ISSN  
Shelfmark

Search hints:

- You can use the 'OR' operator to find records containing 'heart OR cardiac' AND 'surgery' will find records containing 'word 'surgery'.
- If you do not use an operator your terms are automatically combined using AND.
- If you wish to search for an exact phrase, e.g. computer programming select the Yes button.
- Use the ? character to match portions of words. 'environ?' will find 'environs', 'environment', 'environmental' etc. 'tphonic' will retrieve 'polyphonic', 'stereophonic', 'telephonic', etc.
- The system supports variant spellings. 'labour' will find 'labor' or 'labour'.
- You can use upper or lower case letters. 'computer' will find 'computer', 'Computer' and 'COMPUTER'.
- Leave out leading articles such as 'a', 'the', 'le' and 'la'.

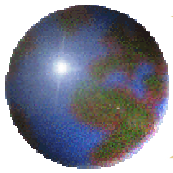
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## *Bibliographic Record*





# *Lists of OPACs*

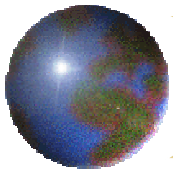
- ✚ Online Public Access Catalog

  - ▣ Web-based opacs

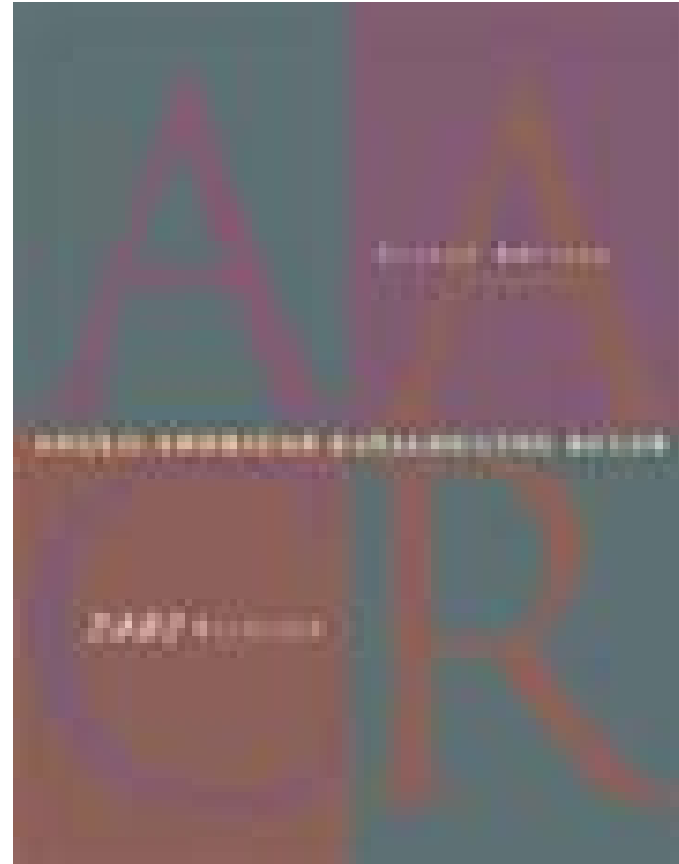
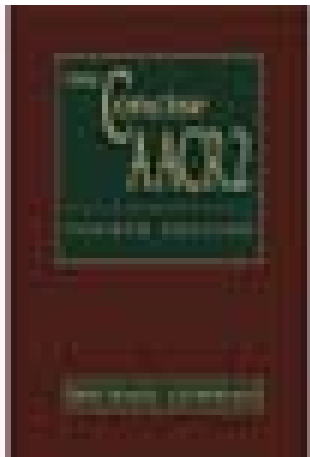
- ✚ 18,000 OPACs now

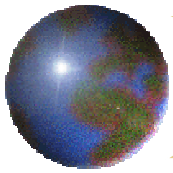
- ✚ URL: <http://www.libdex.com/>





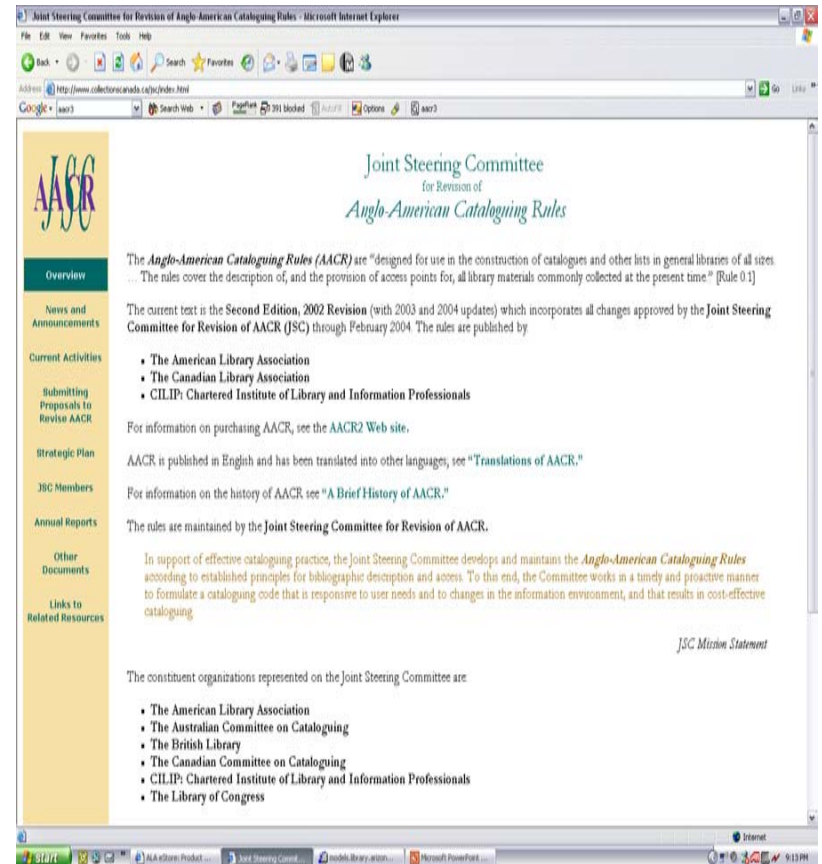
# *AACR2, AACR2R ...*

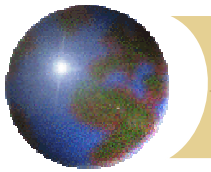




# AACR

- The *Anglo-American Cataloguing Rules (AACR)* are “designed for use in the construction of catalogues and other lists in general libraries of all sizes. ... The rules cover the description of, and the provision of access points for, all library materials commonly collected at the present time.” [Rule 0.1]





# *The Cataloging Process*

## I. Descriptive Cataloging

1. Create Unique Bibliographic Description (of Book)

- a) 8 “areas” of Description
- b) ISBD:
  - i) elements
  - ii) order
  - iii) punctuation

1. Provide Access To Bibliographic record (For Work)

- a) Choice of Access Points:
  - i) main entry
  - ii) added entries

Form of Entries

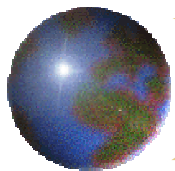
Authority Control

## II. Subject Cataloging

1. Perform Subject Analysis

1. Assign Classification Number (numerical subject access)

2. Assign Subject Headings (verbal subject access)



# *The Cataloging Process*

## *Cataloging process*

Descriptive  
Cataloging

Description  
(Creation of  
bibliographic  
record)

Choice of entry

*AACR2R*  
*ch. 1-2*

Form of entry

*AACR2R*  
*ch. 21*

*AACR2R*  
*ch. 22-26*

Subject  
Cataloging

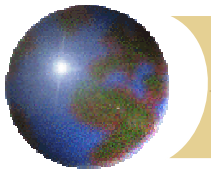
Classification

*DDC*

*LC*

Subject headings

*LCSH*



# *Core record*

## ISBD

- ✚ Mandatory elements
- ✚ Title proper (etc.)

## AACR

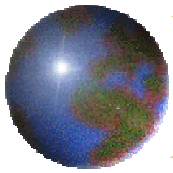
1<sup>st</sup> level of description

Title proper (etc.)

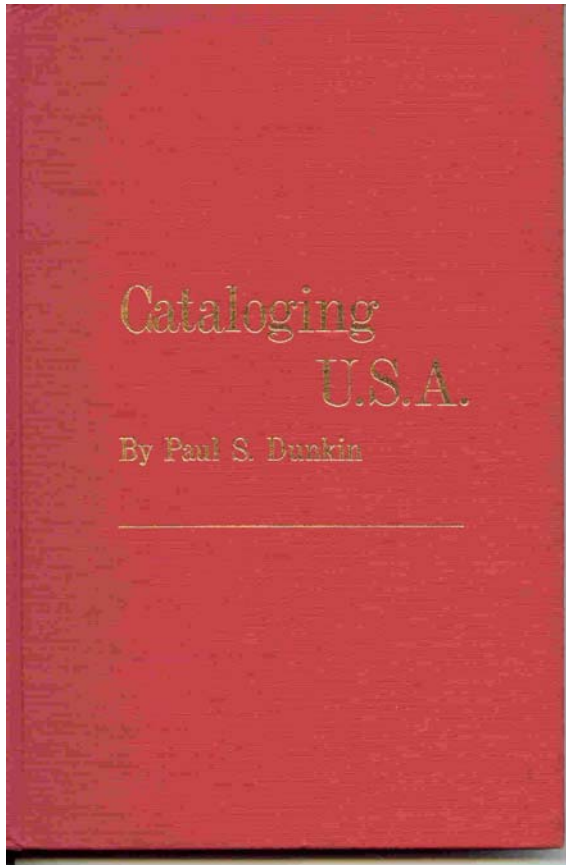
*Class of Material:*

Books, Cartographic materials, manuscripts, music, sound recordings, motion pictures, electronic resources, etc.

*Type of publication:* finite, continuing resources

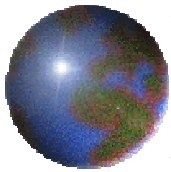


# *Cataloging – Criticisms*

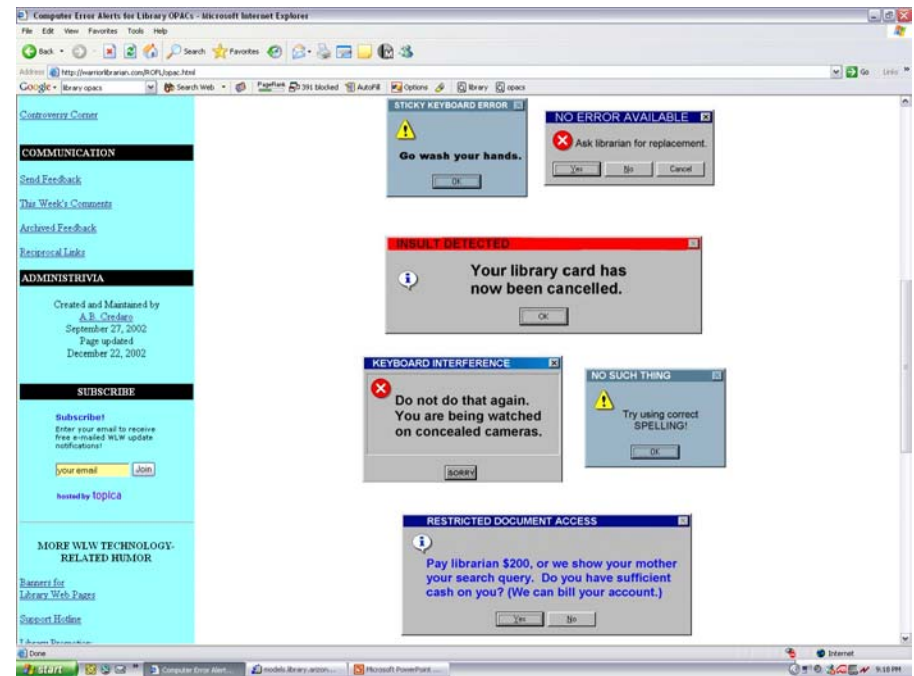
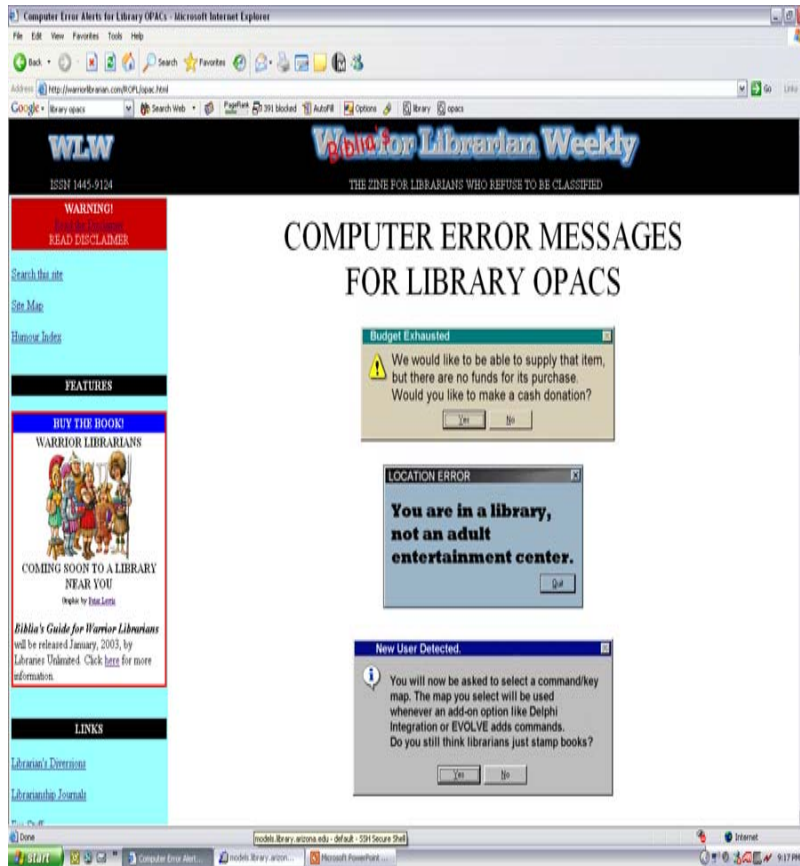


- Cataloging U.S.A
  - By Paul Dunkin
  - ALA
  - c1969
- "It is a why-to-do-it book"
- Principles and theory
- Quality, productivity, convenience of the cataloger not user



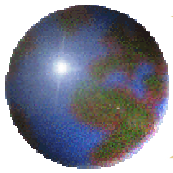


# OPAC Error Messages



Source:

<http://warriorlibrarian.com/ROFL/opac.html>



# AACR3

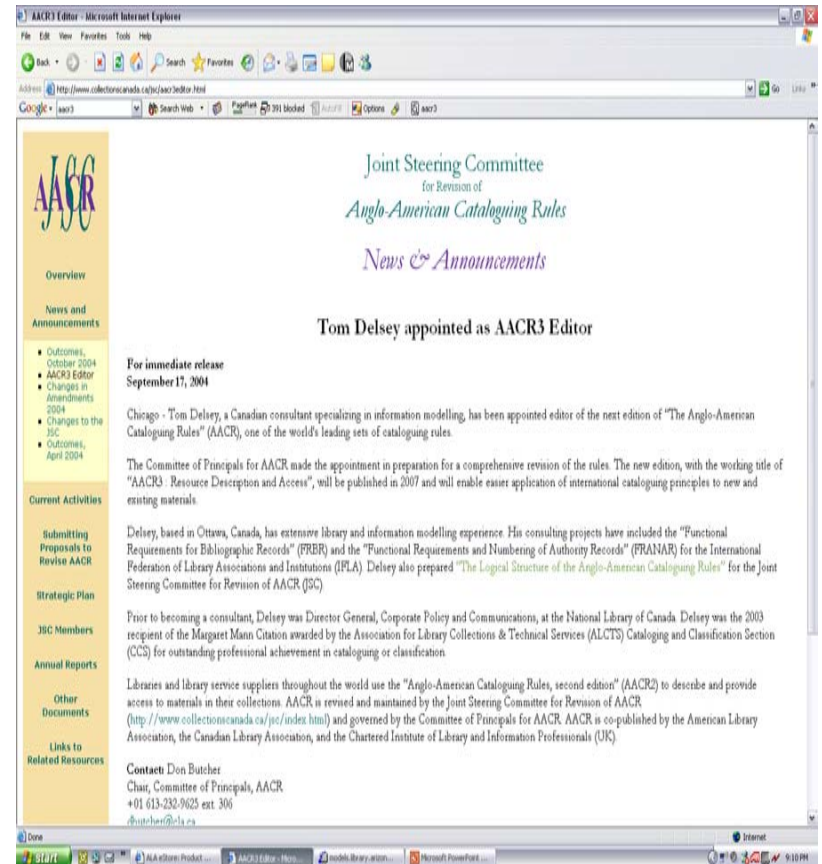
Tom Delsey

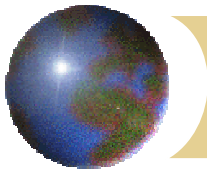
Editor, AACR3

Barbara Tillett

AACR3 presentations

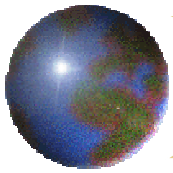
- Simplify (judgment)
- Content standard
- International
- Consistency
- Collocation
- GMD, relationships



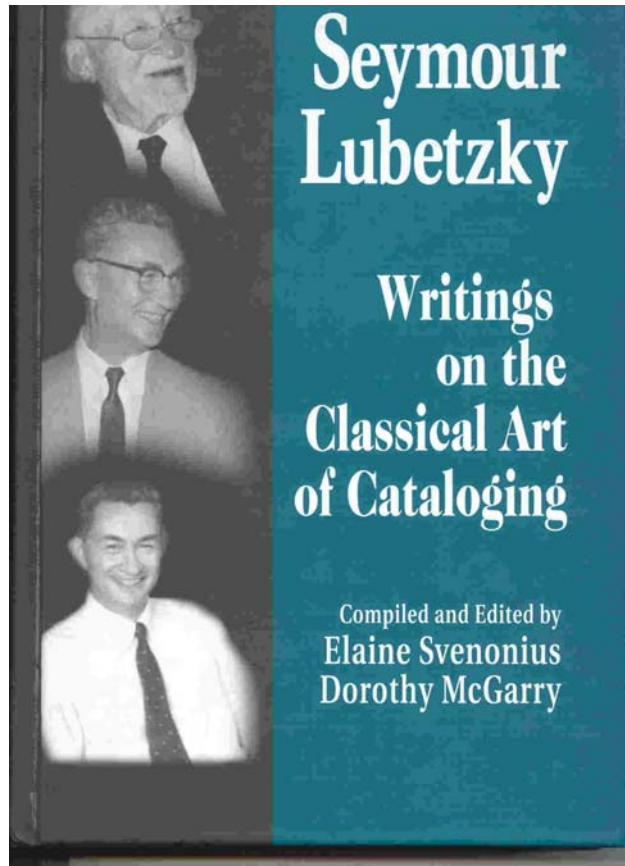


# *FRBR Bibliographic Entities*

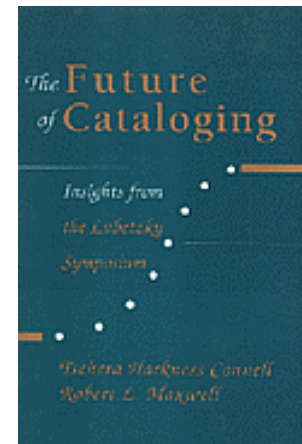
- ⊕ Work (attributes: title, form, date)
- ⊕ Expression
- ⊕ Manifestation
- ⊕ Item
- ⊕ Person/Corporate Body
- ⊕ Concept
- ⊕ Object
- ⊕ Event
- ⊕ Place



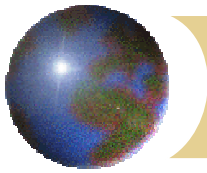
# *Prelude to FRBR*



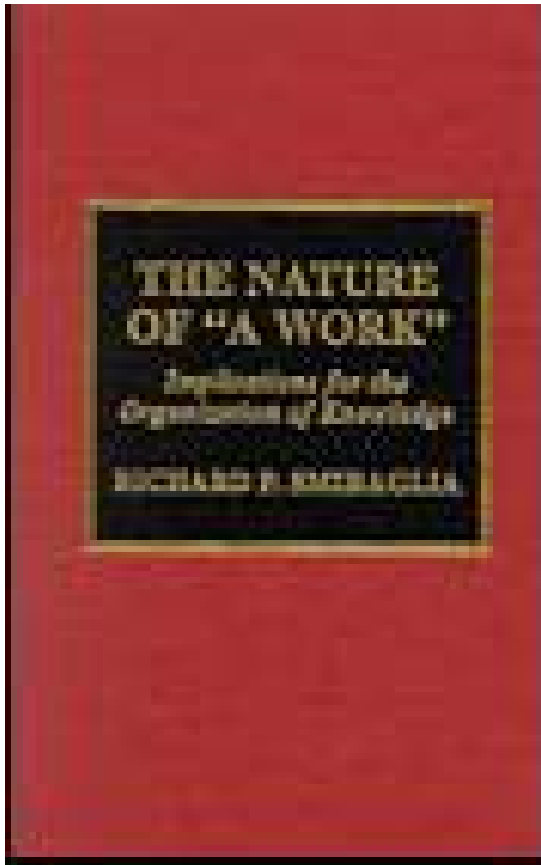
- ✿ Seymour Lubetzky
  - ✚ Paris Principles
  - ✚ Work Principle
- ✿ Patrick Wilson (Eva Verona)



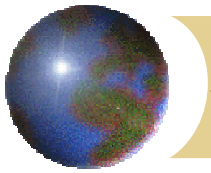
Coleman, FRBR, 2 Dec. 2004, AzLA  
Conference, Tucson



# *'Works' for Information Retrieval*

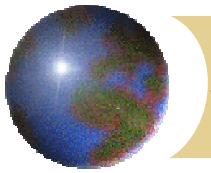


- ✿ Richard Smiraglia, 2000
- ✿ Definition of 'Works'
- ✿ Theological works
- ✿ Musical works
- ✿ Video/Audio (form)
- ✿ Scientific models (concept/subject)
- ✿ OPAC display



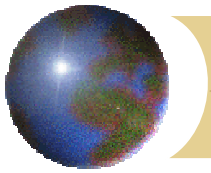
# *Research Questions*

- ⊕ Are scientific models “works”?
- ⊕ What are the facets in a scientific models classification scheme?
- ⊕ Overarching question: What is a scientific model and how can it be represented in the library catalog to reveal disciplinary structures and facilitate information retrieval for learning?



# *Definition of scientific models*

- ✚ Science and engineering disciplines
- ✚ Works: Intellectual artifacts, Creative process
- ✚ Domain: Physical Geography (Atmosphere, Soils, Water)
- ✚ Tested: document of models on the WWW and content analysis of models in published literature

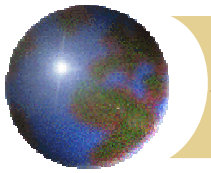


## *“Work” defined*

- ✿ “A work is the intellectual content of a bibliographic entity; any work has two properties: a) the propositions expressed, which form ideational content and b) expressions of those propositions which form semantic content.”

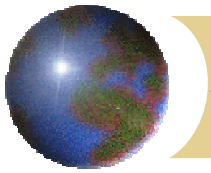
■ Source: Smiraglia, Richard P. (2001)





# *Physical Components*

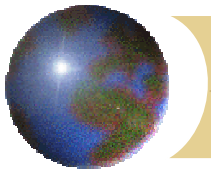
- Texts (articles, bibliographies, reviews, reports, documentation)
- Datasets (data)
- Software (code)
- Services (databases)



# *Conceptual components*

## ✿ Subject + other

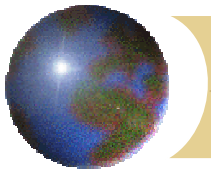
- ▣ Focus of research: object, process
- ▣ Type of model
- ▣ Mathematical functions
- ▣ Instrumentation
- ▣ Fundamental theory or law
- ▣ Replication, revision, modification



# *What is a scientific model?*

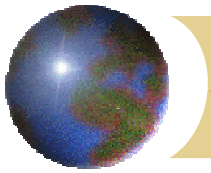
## Information resource (form & format)

- ➊ 1. Theory or Hypothesis (text file or graphic diagram/image)
- ➋ 2. Observations and Measurements (data sets in various formats)
- ➌ 3. Computer Hardware (descriptions only)
- ➍ 4. Computer Software (this includes actual software executable code, other software essential for running the model code itself)
- ➎ 5. Documentation (technical and user guide that accompanies the software)
- ➏ 6. Animations (images, video)
- ➐ 7. Visualizations (images, video)
- ➑ 8. Reports, Reviews, Annotations, Experiments, Articles (text)
- ➒ 9. Tools (applets, services)
- ➓ 10. Mathematic (algorithmic, numeric notation)
- ➔ 11. FAQs, Mailing Lists/Listservs, Discussion Groups, Events (various)



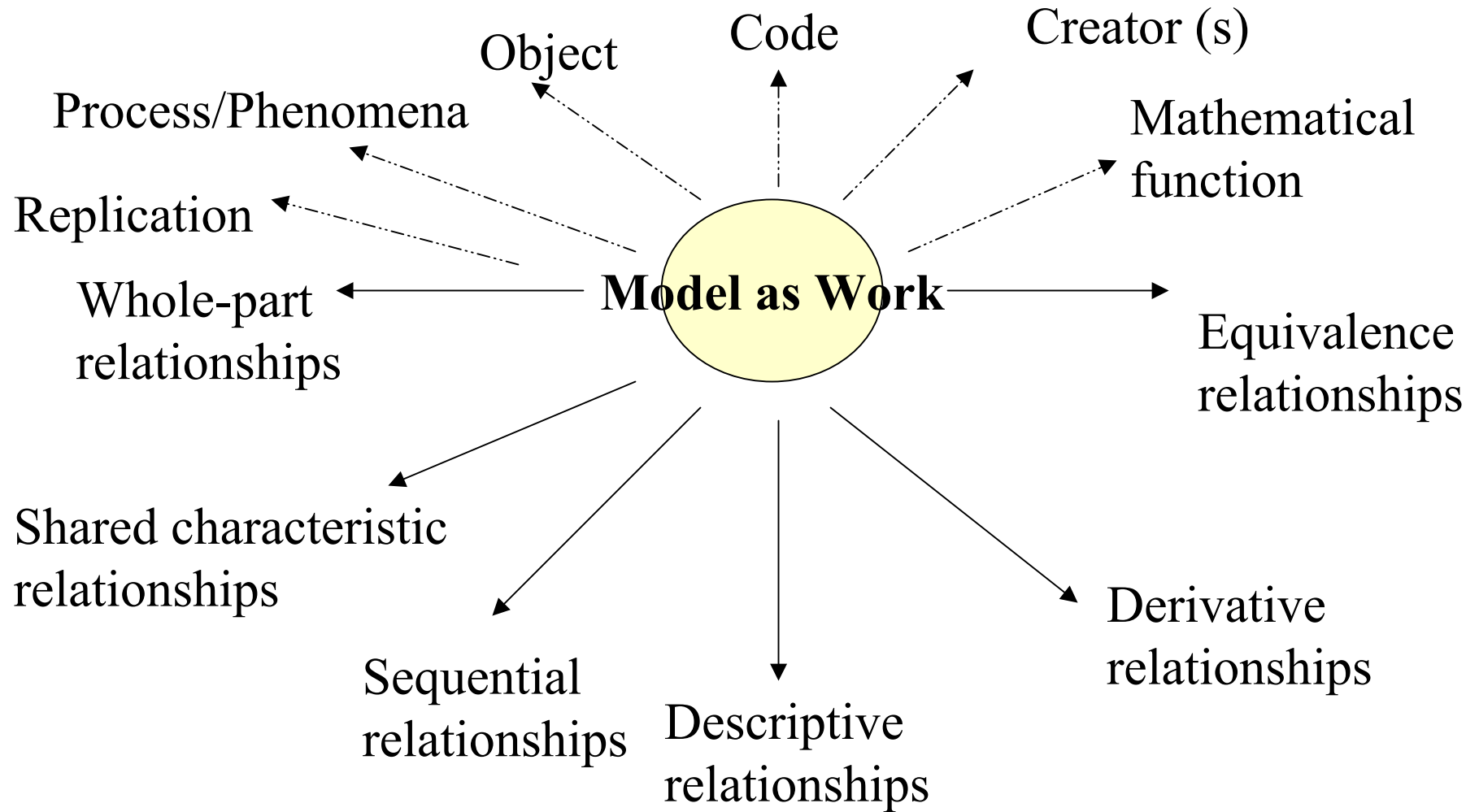
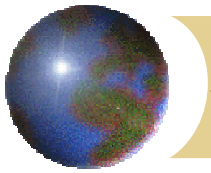
# *Scientific model – facets (attributes)*

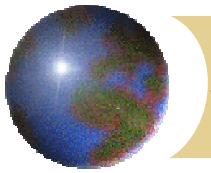
- **Concept:** is an idea, the traditional subject (for example, calculus of variations)
- **Object:** the object studied in the model
- **Discipline:** the major discipline to which this model belongs (may be determined either through author affiliations or other means)
- **Phenomenon:** the phenomenon being modeled
- **Process:** the process being modeled
- **MathRepresentation:** the mathematical functions, equations used
- **Software:** the software needed to run the model
- **FundamentalLaw:** the fundamental laws that the model is based upon
- **Type:** the type of model based on its purpose
- **Variable:** number, types, conditions, and variables in this model
- **Problem:** the problem the model is analyzing stated often as a question
- **Theory:** is there an existing theory or research group to which this model belongs



# *Relationships*

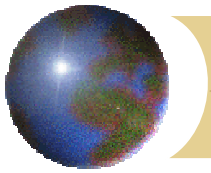
- ✿ Bibliographic relationships
  - ▣ Tillett's Taxonomy of Bibliographic Relationships include derivative, equivalence, descriptive, whole-part, accompanying, sequential, and shared characteristic relationships
- ✿ Subject relationships
  - ▣ Facet analysis of subjects





## *Sample Models*

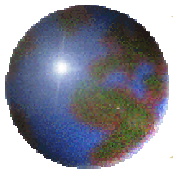
- ❖ Plug flow reactor models (Streeter & Phelps, 1925)
- ❖ BOD/DO (Streeter & Phelps, 1925)
- ❖ Oxygen-balance model (Streeter & Phelps, 1925)
- ❖ QUAL models (current version, Brown & Barnwell, 1987)
- ❖ QUAL 11



## *Questions for further research*

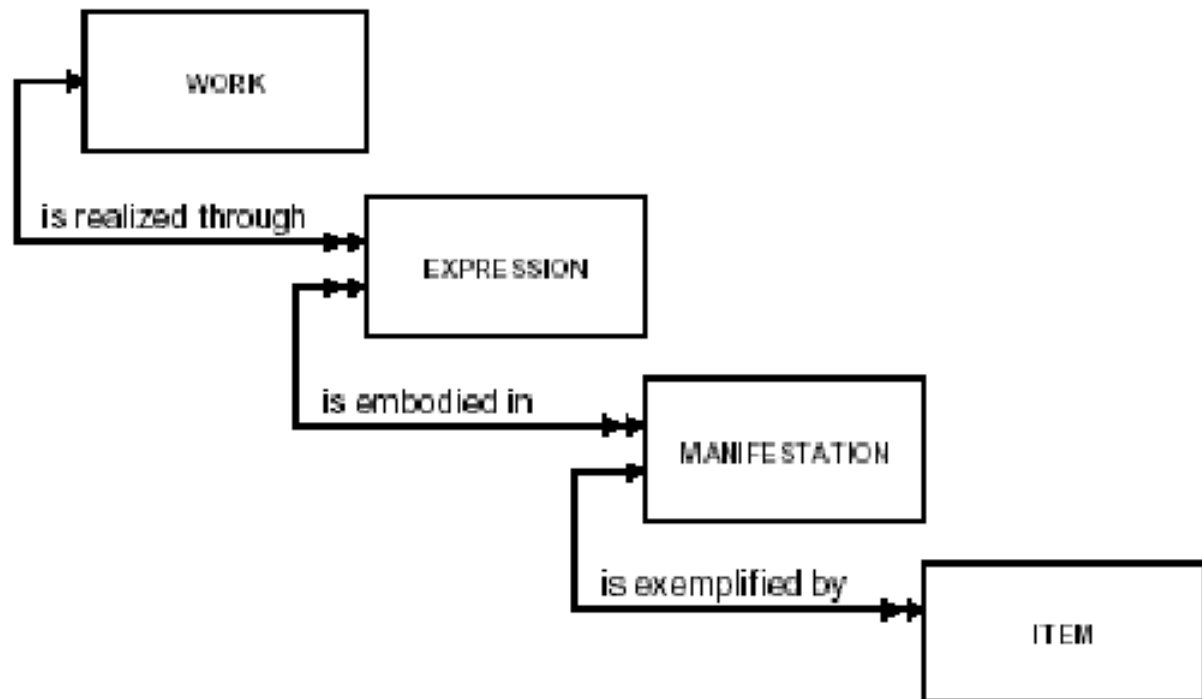
- ⊗ What are shared characteristics of scientific models?
  - ⊠ How can they be used to sort and display results in library catalogs?
- ⊗ Which bibliographic relationships do representations about model replications best fit?
- ⊗ What's the difference between a work and a concept? (Identifying boundaries)



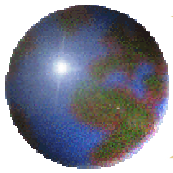


# FRBR

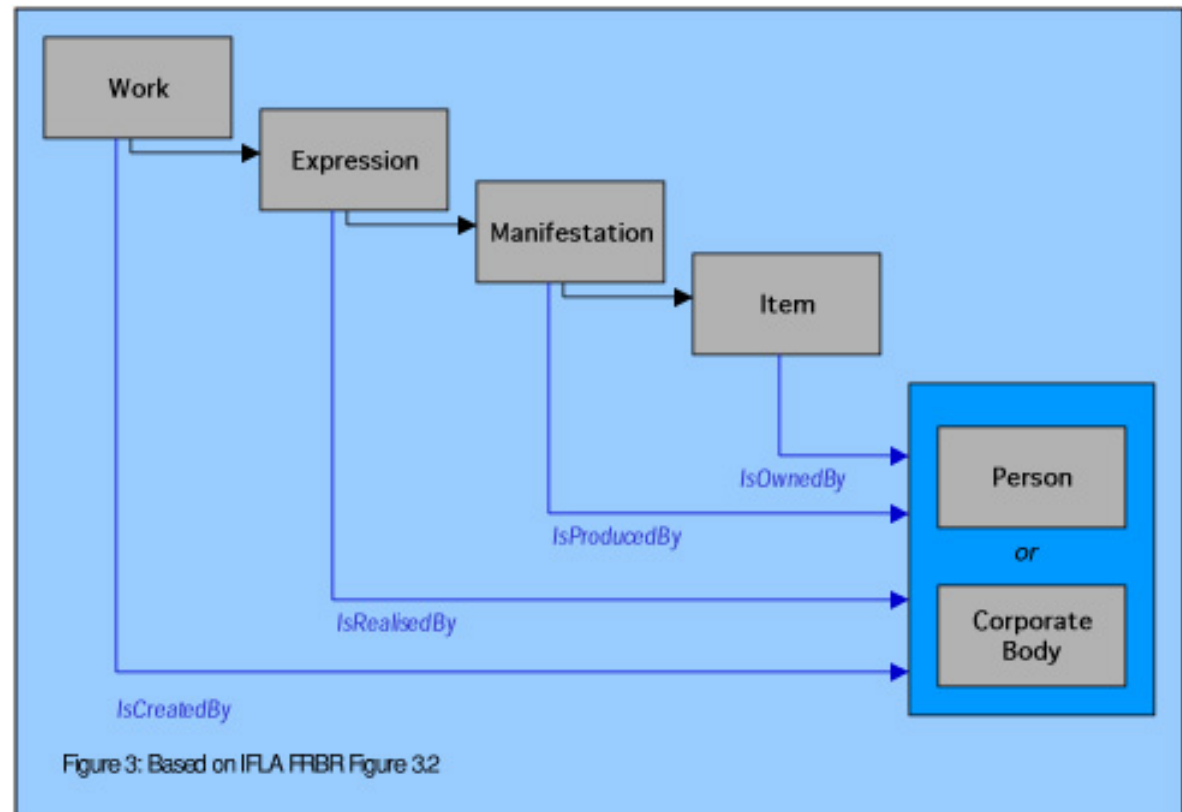
## Group 1 Entities and Primary Relationships

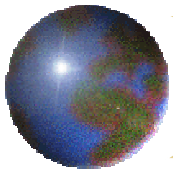


Source: Functional Requirements for Bibliographic Records, IFLA

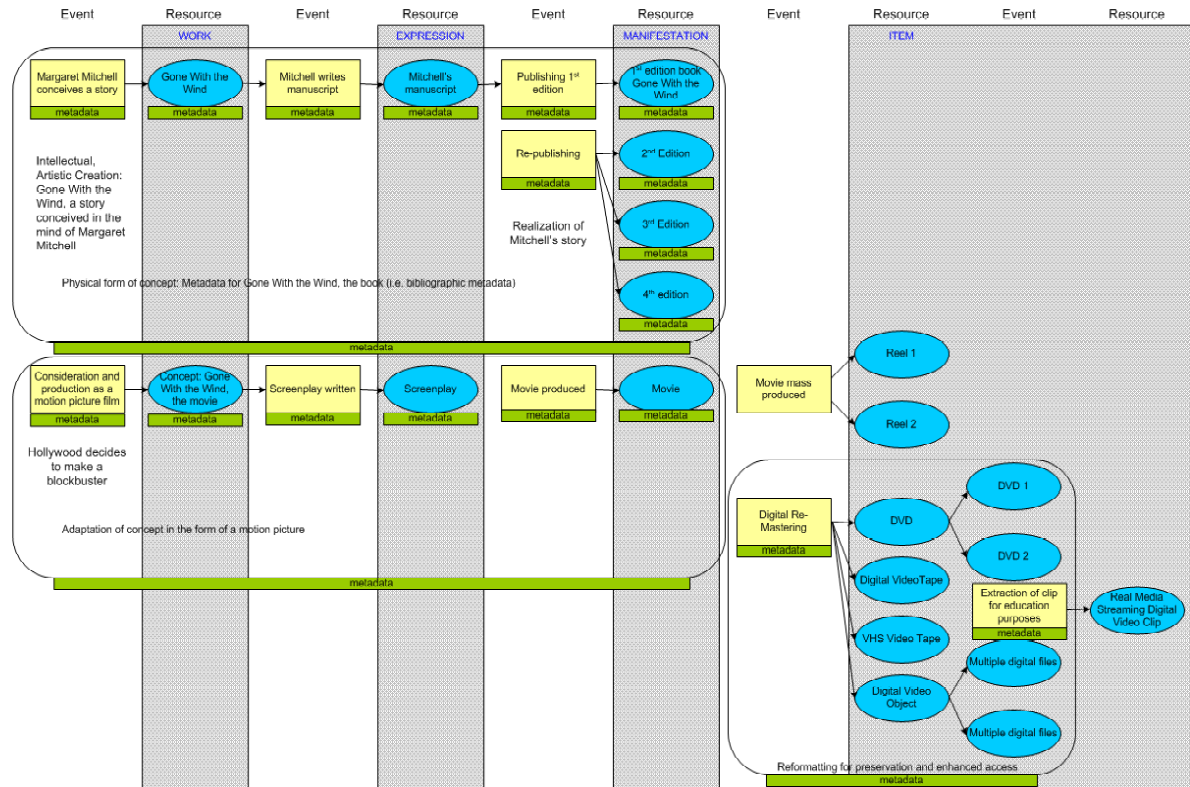


# FRBR

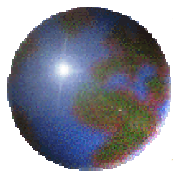




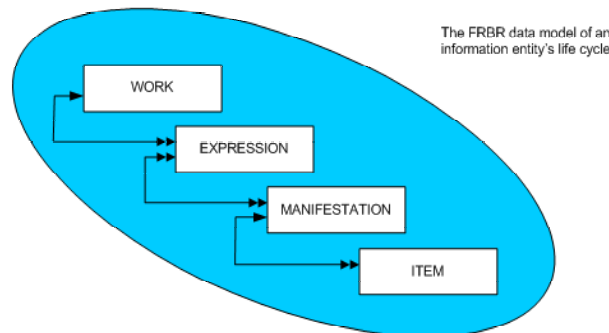
# FRBR



This figure and the next two are from University of Texas Library,  
Digital Assets Management Group  
<http://www.lib.utexas.edu/dls/dadg/metadata/graphics/>



# FRBR - Model

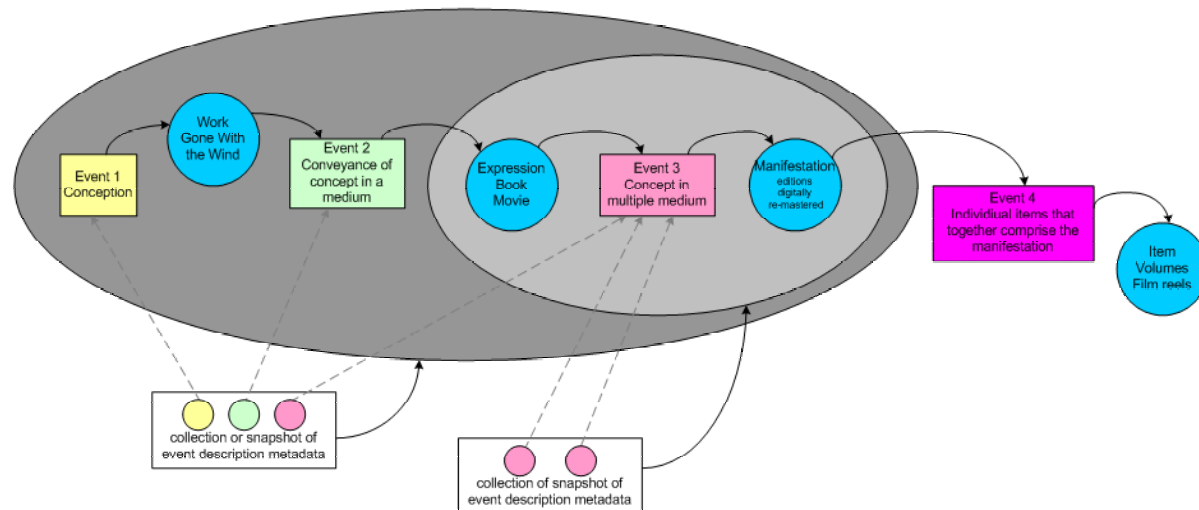


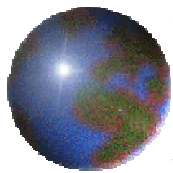
Idea/Work = Gone With the Wind

Expression = book and movie

Manifestation = book: 1<sup>st</sup> ed, 2<sup>nd</sup> ed, 3<sup>rd</sup> ed; movie: original, digitally re-mastered

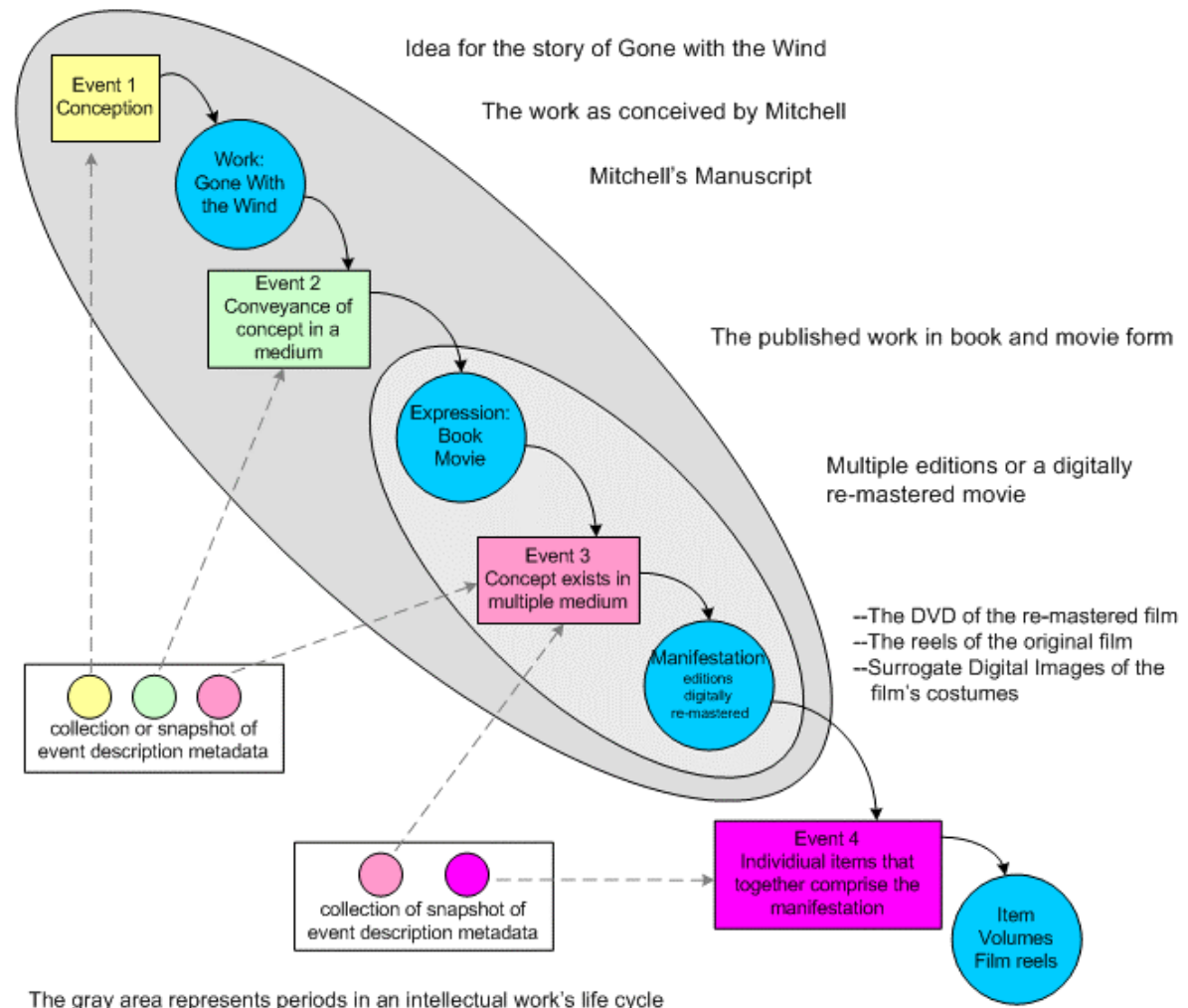
Item = book: 3<sup>rd</sup> ed: volume 1 and 2

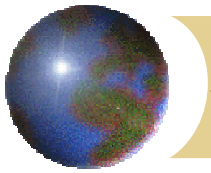




# FRBR

Integration of relationship and instantiation entities for developing a metadata data model

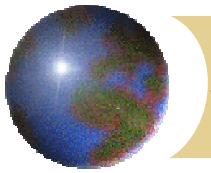




# *What is FRBR?*

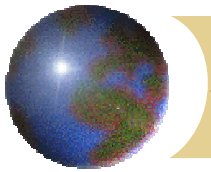
## ❖ It is not a data model

- ❖ "FRBR is too abstract and generic to be a data model: no practical database could actually be developed exclusively on the basis of those entities, attributes, and relationships that are defined in FRBR. For instance, FRBR simply mentions that an instance of the Expression entity has a "title" as one of its attributes. What is the real nature of this title? Is it a uniform title? Is it based on the uniform title for the related work, with additional elements? Is it some form of the "title proper" found on a document? Should it be controlled by an authority record? etc. In the process of developing an actual database, you would have to make a decision about that "title of an expression".
- ❖ Source: <http://www.ifla.org/VII/s13/wgfrbr/faq.htm>



## *What is FRBR then?*

- ✚ It is a reference model
- ✚ It *can* be implemented, but it first has to be "translated" into a data model and a format.
- ✚ Unanswered questions:
  - ▣ MARC or XML
  - ▣ One record per entity or four-tiered records



# *FRBR*

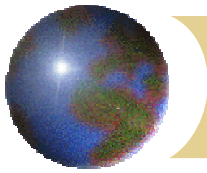
## ✚ Connecting Users to the Catalog

- ▣ Find (entities that correspond to search criteria)
- ▣ Identify (an entity)
- ▣ Select ((an entity appropriate to user needs)
- ▣ Obtain (access to the entity described)

## ✚ Entities

- ▣ Group 1 (Bibliographic: Work-E-M-Item 4 tree hierarchy), Group 2 (persons/groups responsible), Group 3 Entities (Subject: Concept, Object, Events, Places)





# *FRBR – AACR2R*

## ⊕ Content and Carrier

### ⊞ Work (Content)

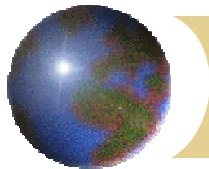
- Category of work
  - Literary
  - Musical etc.

### ⊞ Expression

- Mode of expression

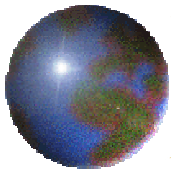
## ⊕ Manifestation (Carrier)

### ⊞ Type of medium, Status, Access, Issuance, Termination



## *FRBR Projects*

- ❖ OCLC Fiction Finder
- ❖ Australian Literature (literary and creative works)
- ❖ VTLS Virtua (FRBR-ized OPAC)
- ❖ Variations 2 (Music Library Project, Indiana University)
- ❖ VisualCat (Danish cataloging client)  
Z39.50, IFLA 4Im (FRBR), XML & MARC



# OCLC

**FRBR [OCLC - Projects] - Microsoft Internet Explorer**

File Edit View Favorites Tools Help

Back Forward Stop Search Favorites AutoFill 391 blocked Options fbr projects

Address <http://www.oclc.org/research/projects/frbr/default.htm> Go Links

Google fbr projects Search Web PageRank

### Goals

The goals of OCLC's FRBR projects are to:

- test the feasibility of implementing the FRBR structure in a large catalog database
- examine the issues associated with the conversion of a set of bibliographic records to conform to FRBR requirements.
  - This process sometimes is informally referred to as "FRBRization".
- build prototype services utilizing the FRBR-ized database.

### Projects

Using an exemplary work as a case study, researchers hope to better understand the relationship between the bibliographic records and the bibliographic objects they represent, and to determine if the information available in the bibliographic records is sufficient to reliably identify FRBR entities.

1. [xISBN](#)
2. [FictionFinder](#)
3. [Algorithm](#)
4. [Extending the Case of Clinker](#)
5. [Case Study: The FRBRization of Humphry Clinker](#)

### Publications

- Bennett, Rick, Brian F. Lavoie, and Edward T. O'Neill. 2003. "The Concept of a Work in WorldCat: An Application of FRBR." *Library Collections, Acquisitions and Technical Services* 27,1 (Spring). E-print available at [http://www.oclc.org/research/publications/archive/2003/lavoie\\_fbr.pdf](http://www.oclc.org/research/publications/archive/2003/lavoie_fbr.pdf). (PDF:354K/32pp.)
- O'Neill, Edward T. 2002. "FRBR: Application of the entity-relationship model to *Humphry Clinker*." *Library Resources and Technical Services* 46,4 (October). E-print available at [http://www.oclc.org/research/publications/archive/2002/oneill\\_fbr22.pdf](http://www.oclc.org/research/publications/archive/2002/oneill_fbr22.pdf). (PDF:411K/35pp.)
- Hickey, Thomas B., Edward T. O'Neill, and Jenny Toves. 2002. "Experiments with the IFLA Functional Requirements for Bibliographic Records (FRBR)." *D-Lib Magazine* 8, 9 (September).

### Presentations

- O'Neill, Edward T. "Functional Requirements for Bibliographic Records: OCLC's Experience Identifying and Using Works" (PowerPoint:26MB/35 slides) Given at FRBR Workshop, 8-9 July 2004, Frankfurt (Germany).

### Background

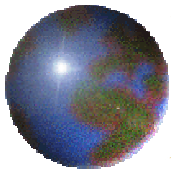
FRBR conceptualizes three groups of entities:

- *Group 1* consists of the products of intellectual or artistic endeavor (e.g., publications).
- *Group 2* comprises those entities responsible for intellectual or artistic content (a person or corporate body).
- *Group 3* includes the entities that serve as subjects of intellectual or artistic endeavor (concept, object, event, and place).

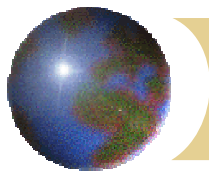
The internal subdivision of Group One entities is important as well. FRBR specifies that intellectual or artistic products include the following types of entities:

- **the work**, a distinct intellectual or artistic creation

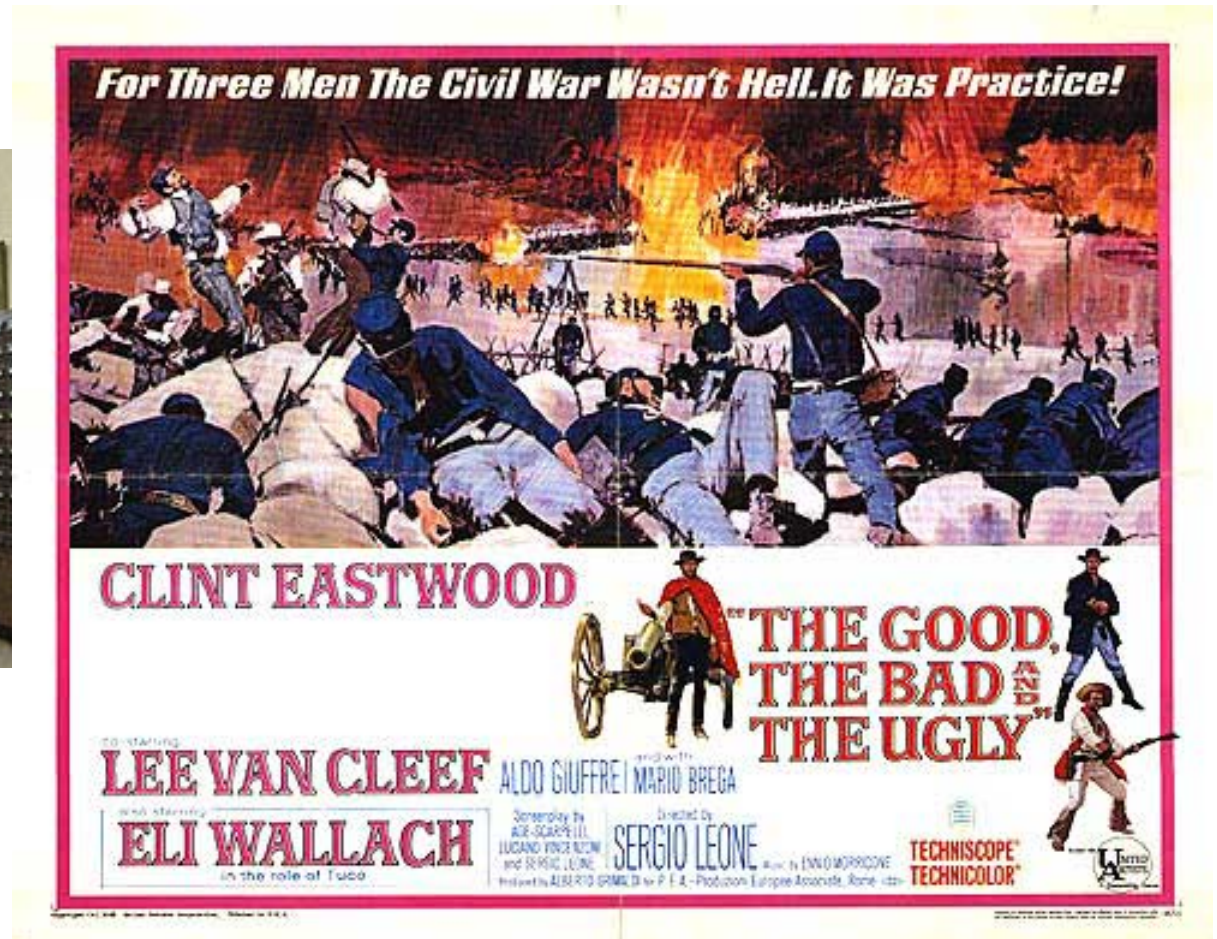
start Microsoft PowerPoint... FRBR [OCLC - Project... Internet 4:58 AM



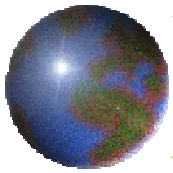
# AusLit



# Past



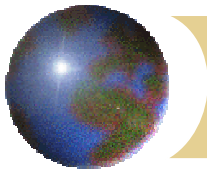




# *Present*



- 1) Web-based OPACs; 2) Standardization: Bibliographic record (AACR2R/MARC; Dublin Core); Display (short and long); basic search queries (author, title, keyword); 3) Lack of consistency: treatment of initial articles; Truncation, Boolean operators, and proximity; 4) Issues of Quality – cataloging & record



# *Future*

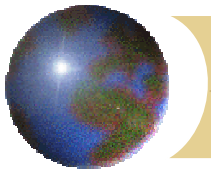
Vox the Librarian in  
The Time Machine  
(movie)

By H.G. Wells



Alexander Hartigan, 17<sup>th</sup> century  
Scientist, given to “eccentric postulation”.  
Search query: (area of inquiry) Physics  
Mechanical Engineering, Temporal Causality  
Temporal Paradox,  
Response: Time travel (fiction) Asimov, Wells  
Hartigan; Wants answer to the question  
Treatise on creation of time machine;  
Gets Musical Score  
Hartigan: “Better luck in a few hundred years”





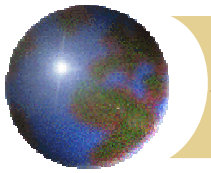
# *Conclusion*

## ✿ Collocation

■ The bringing together of records and/or information packages that are related in some way (e.g., same author, same work (different titles or different editions), same subject, etc. Taylor, 2004, p. 360

✿ Catalog's ability to respond to users' queries - relationships among 'works'





# *References and Notes*

## ✿ IFLA WG FRBR

### ▣ FRBR Bibliography, URL:

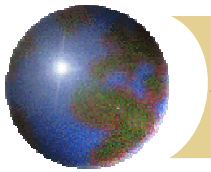
[http://www.ifla.org/VII/s13/wgfrbr/FRBR\\_bibliography.pdf](http://www.ifla.org/VII/s13/wgfrbr/FRBR_bibliography.pdf)

## ✿ Tillett, Barbara.

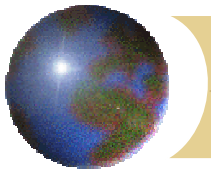
### ▣ *AACR3: Resource description and access.*

URL:

<http://www.collectionscanada.ca/jsc/docs/aacr3pptslides.pdf>



- Coleman, Anita. 2002. Scientific models as works. *Cataloging & Classification Quarterly* 33 (3/4)
- Young, Thurstan. Using FRBR to Measure the Quality of Bibliographic Records. URL: [http://www.cilip.org.uk/groups/cig/ppt/umbrella2003/thurstan\\_young.ppt](http://www.cilip.org.uk/groups/cig/ppt/umbrella2003/thurstan_young.ppt) (for information on FRBR for quality in cataloging and metadata )
- ALA Presentations (eALCTS 2004 Preconference on FRBR). Title: **Back to the Future: Understanding the Functional Requirements of Bibliographic Records Model (FRBR) and its Impact on Users, OPACS, and Knowledge Organization Preconference.** URL: <http://www.ala.org/ala/alcts/alctsconted/presentations/presentations.htm>



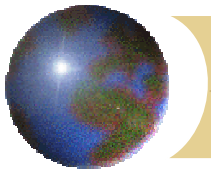
# *Presentation Availability*

## ✚ On my homepage

■ <http://www.u.arizona.edu/~asc>

■ Follow the Publications and Presentations link

■ Will be under AzLA 2004 Conference



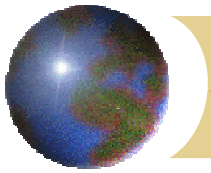
# *Thanks!*

- ✚ Q & A

- ✚ Contact Information:

  - ▣ Email: *asc at dot u dot arizona dot edu*

  - ▣ Phone: +1 (520) 621-3565



## *Acknowledgments & Credits*

- ✚ Thanks to Leslie Sult & Eileen Jaffe for organizing the session & inviting me!
- ✚ Graphics of books covers were in some cases scanned by me and in others 'taken' from the web (using images search in Altavista) or elsewhere as noted.